Global Water System Project

Integrated Studies of the Water Cycle

Global Water System Project: U.S. Working Group Contributions

Charles Vörösmarty (GWSP Co-Chair)

NEWS PI Kick-Off Meeting
NASA-GISS
7 September 2005

A Collaboration of the *Global Environmental Change Programmes*

DIVERSITAS

GLOBAL CHANGE IGBP

WCRP Climate

A joint project w/ financial support from:

NSF

IAI

INTERNATIONAL ATOMIC ENERGY AGENCY

NASA

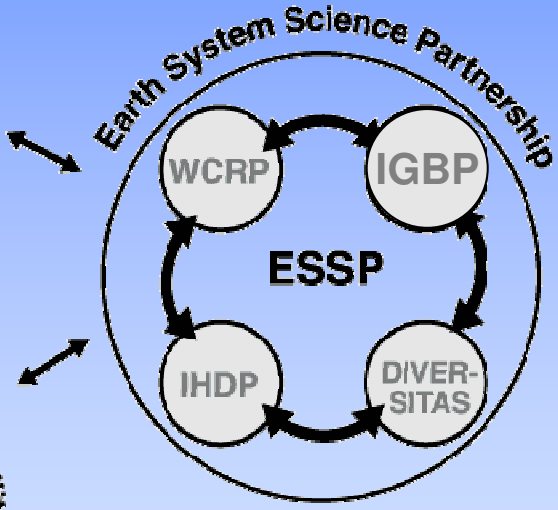
NOAA

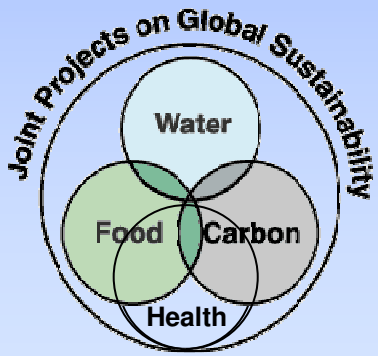
Federal Ministry of Education and Research

Global Water System Project (GWSP)

--From Planning to Execution--

Earth System Science Partnership





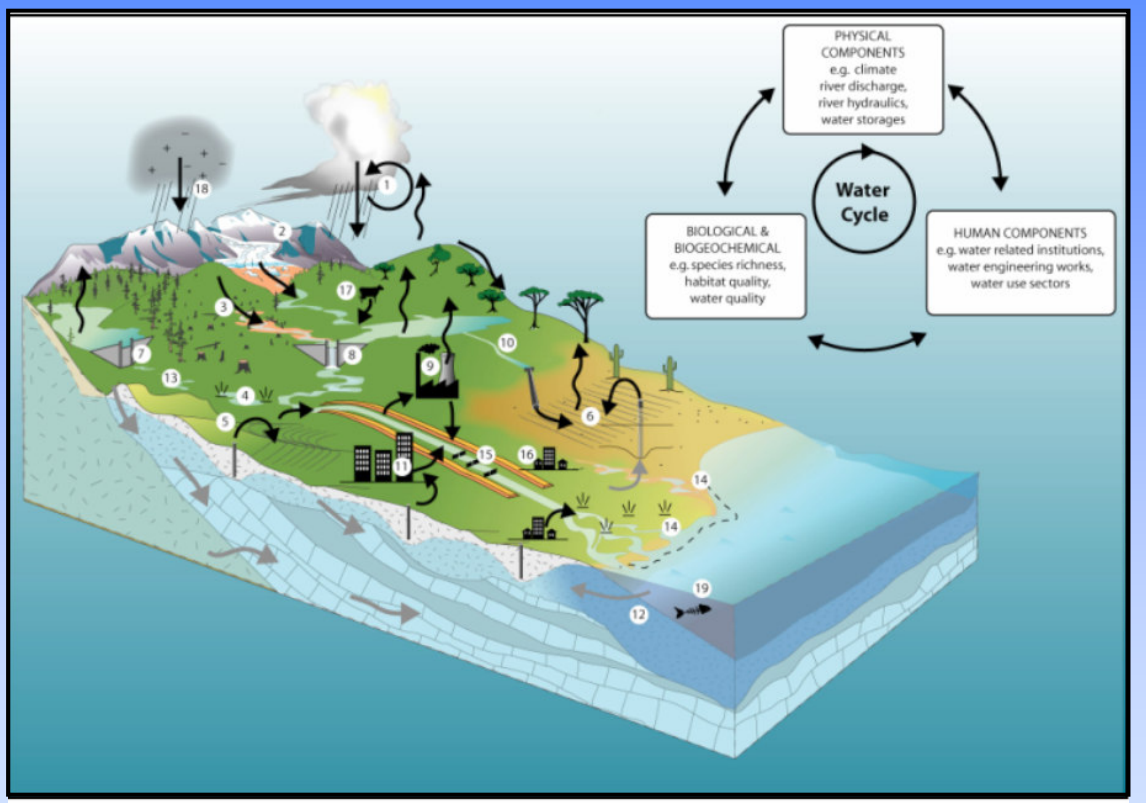
- 4-yr int'l planning effort; ~200 contributors
- GECP consultations, regional planning meetings
- OSC (Portsmouth, NH; Oct. 03) broad agency sponsorship
- IPO Bonn established late '03
- Science Framework & SSC approved '04
- SSC meetings Feb. & Sept. '05
- Dozen "Fast-Track Activities" identified and initiated

GWSP Global Water System Project

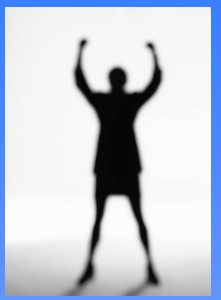
Earth System Science Partnership

The Notion of a Global Water System

- Change is a hallmark of the modern hydrologic cycle
- Both natural and human dimensions
- GWSP seeks to "co-balance" physical, BGC, biological, social science approaches



GWSP Global Water System Project



CENTRAL TENET OF THE GWSP

Humans are changing the global water system in a globally-significant way, but without…..adequate knowledge of the system and thus its response to change

GWSP is Science-Driven but Policy-Informing and organized around 3 science themes:

1. Quantify change and its sources
2. Uncover feedbacks in the global water system
3. Assess system adaptation and resilience

Earth System Science Partnership

GWSP Global Water System Project


GWSP Home page – Netscape
http://www.gwsp.org/
New Tab
GWSP Home page
ESSP
DIVERSITAS
IGBP
IHDP
WCRP
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ABOUT GWSP
The Global Water System Challenge
Water is essential to life on earth, plays a key role in the development and functioning of society and is recognised as a high priority resource for sustainable development. Over the past few decades, environmental science has produced insights into the linkages, interconnections and interdependencies in the global water cycle. The various human and physical, biochemical, and biological facets of the cycle make up the global water system.
The global water system is being transformed by major syndromes including climate change, erosion, pollution and salinisation. We know more about the physical aspects of the global water system and much less about the nutrient flows, biodiversity loss and human dimensions.
The Project
The Global Water System Project (GWSP) is a newly established joint project of DIVERSITAS, an international programme of biodiversity science, the International Geosphere-Biosphere Programme (IGBP), the International Human Dimensions Programme (IHDP) and the World Climate Research Programme (WCRP). These four global change programmes form the Earth System Science Partnership (ESSP).
Earth System Science Partnership
DIVERSITAS
IGBP
ESSP
WCRP
IHDP
Joint Projects on Global Sustainability
Water
Food
Carbon
Human Health
For further information:
Download GWSP Science Framework Document (approx. 2MB)
Download Powerpoint Presentation (approx. 3MB)
Download GWSP brochure (700KB)
Download GWSP Factsheet (130KB)


Eos, Vol. 85, No. 48, 30 November 2004
EOS
VOLUME 85 NUMBER 48
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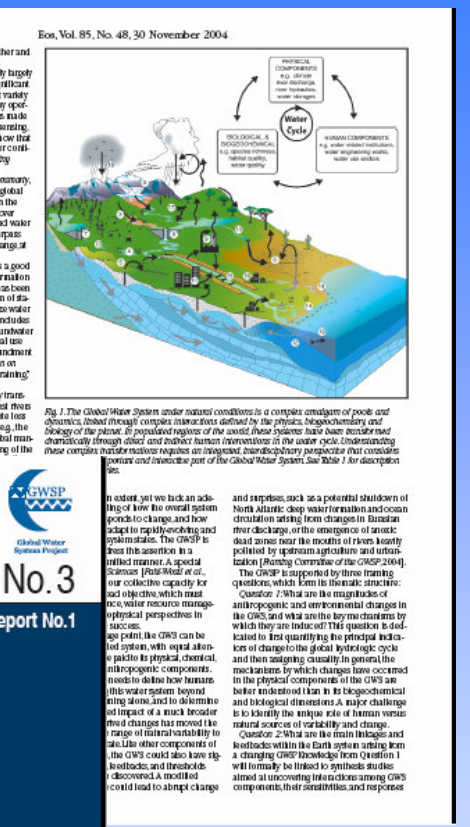
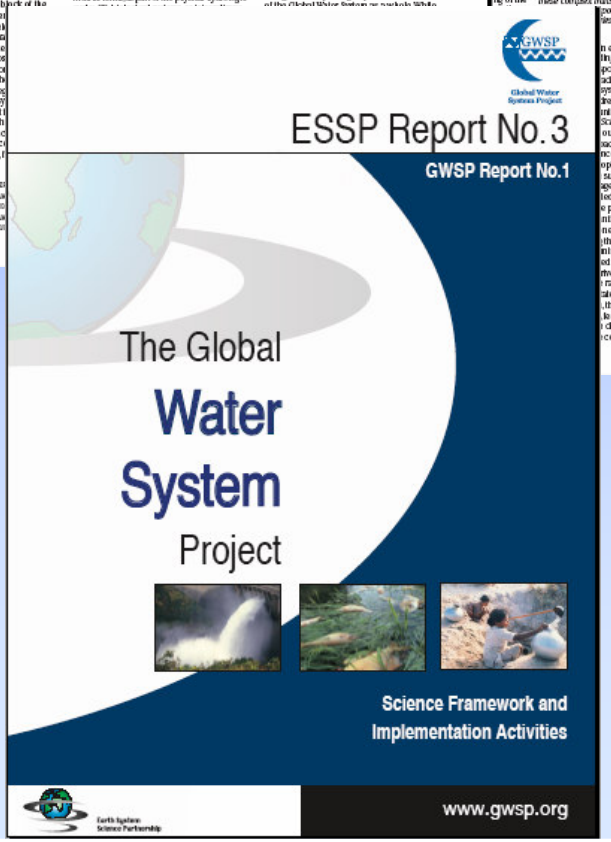
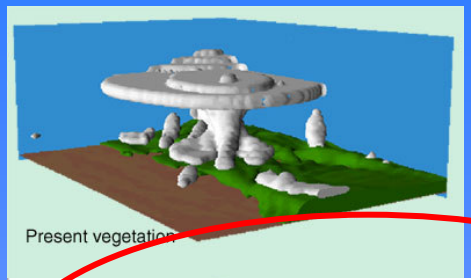
PAGES 509–520
Humans Transforming the Global Water System
PAGES 509, 513–514


Eos, Vol. 85, No. 48, 30 November 2004
Water Cycle


GWSP
Global Water System Project
ESSP Report No. 3
GWSP Report No.1
The Global Water System Project
Science Framework and Implementation Activities
www.gwsp.org
Earth System Science Partnership

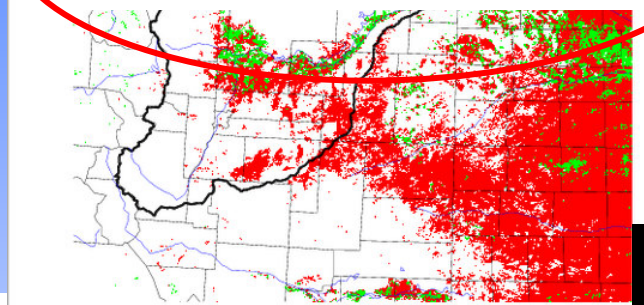
www.gwsp.org



Potential U.S. Contributions to GWSP

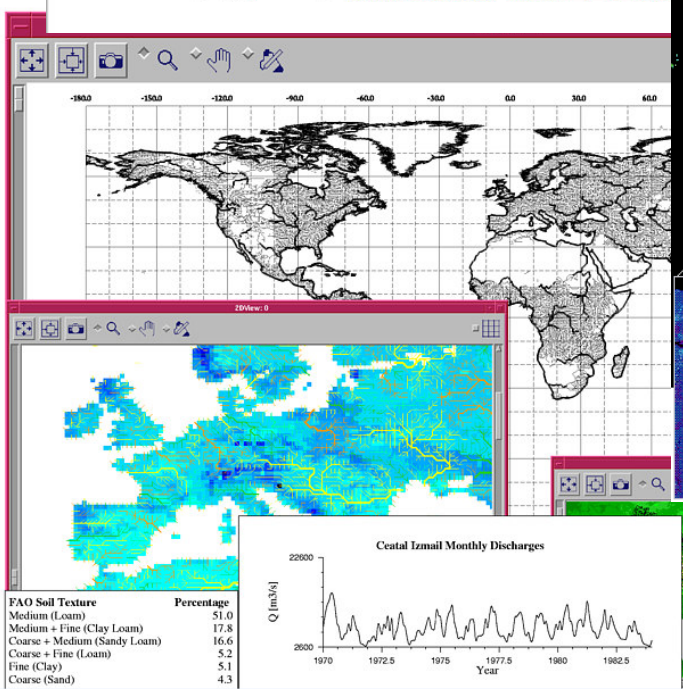
- Operational and satellite-based monitoring of the hydrosphere
- Simulation models (NWP, 4DDA, GCMs, RCMs, ESMs)
- Education and outreach: Training new generation of thinkers in integrative, broad-scale science
- Policy assessment

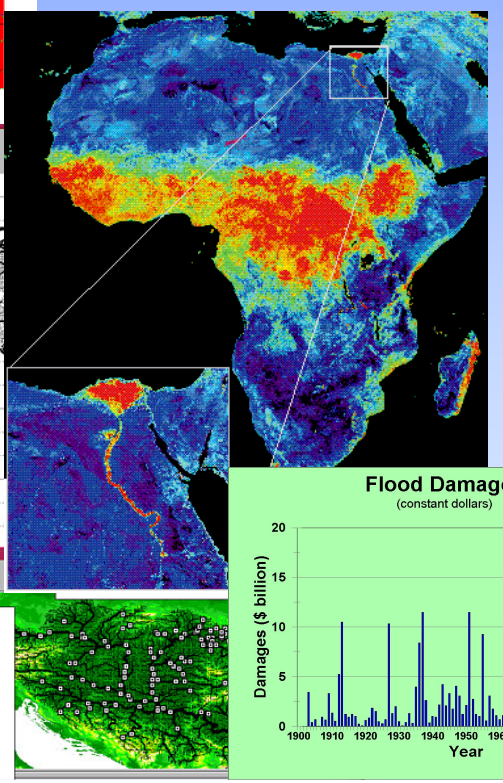
PARTICULARLY NASA-"NEWS-WORTHY"

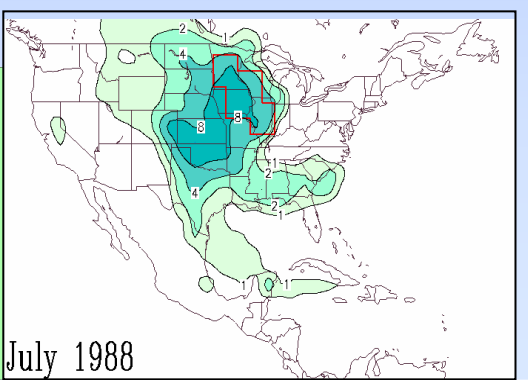


In turn, GWSP Can Contribute

- Global and regional partners
- Interdisciplinary and integrative context
- Int'l policy dialogue







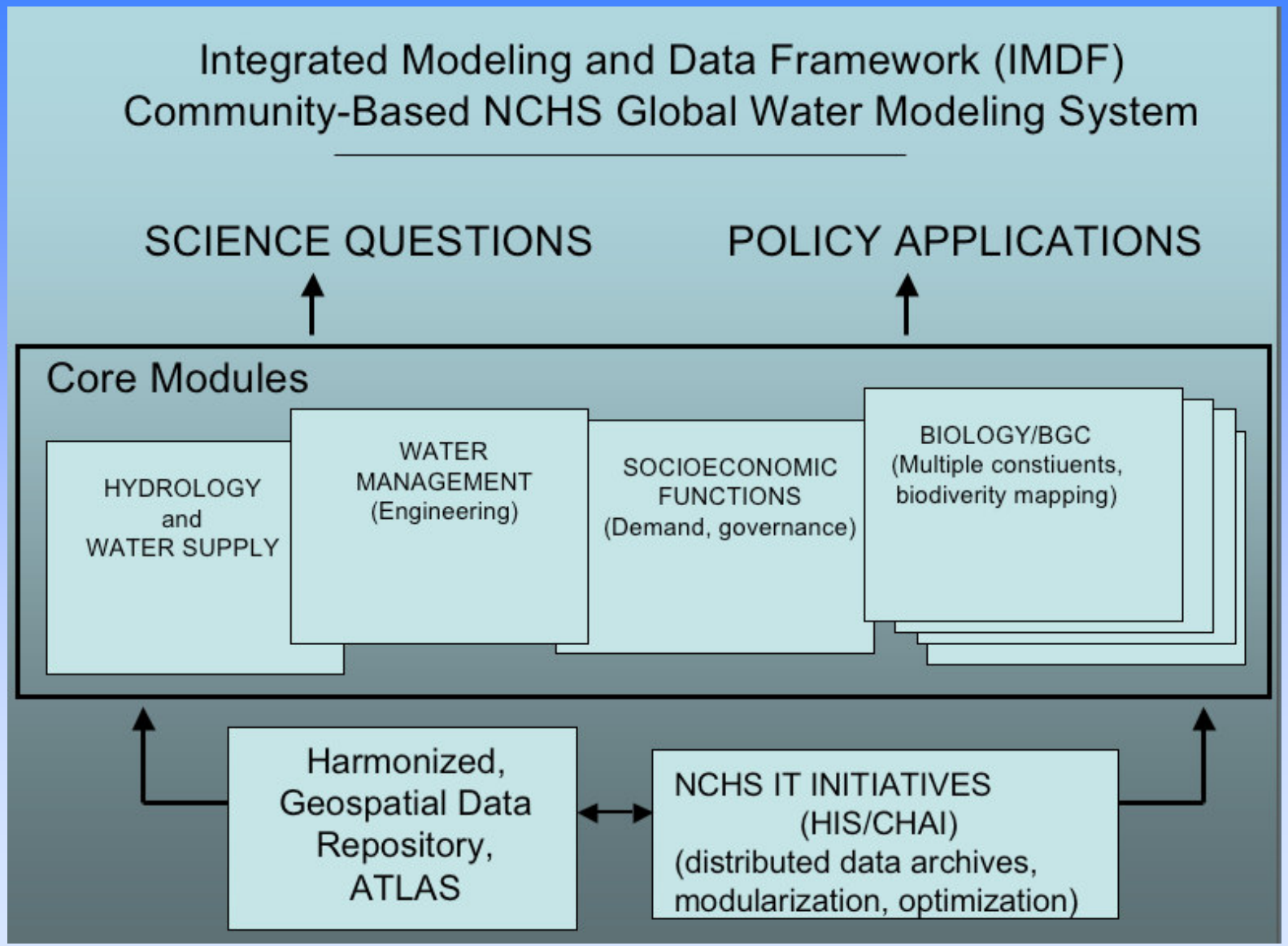
Invitation by CUAHSI National Center for Hydrologic Synthesis (NCHS) (UC Berkeley) to form a Global Water Science Working Group

OVERALL SCIENCE THEME OF GWS-WG: *To quantify the collective, systemic, and global-scale significance of widespread change to the hydrology of the planet, identifying the natural and anthropogenic agents of such change by*

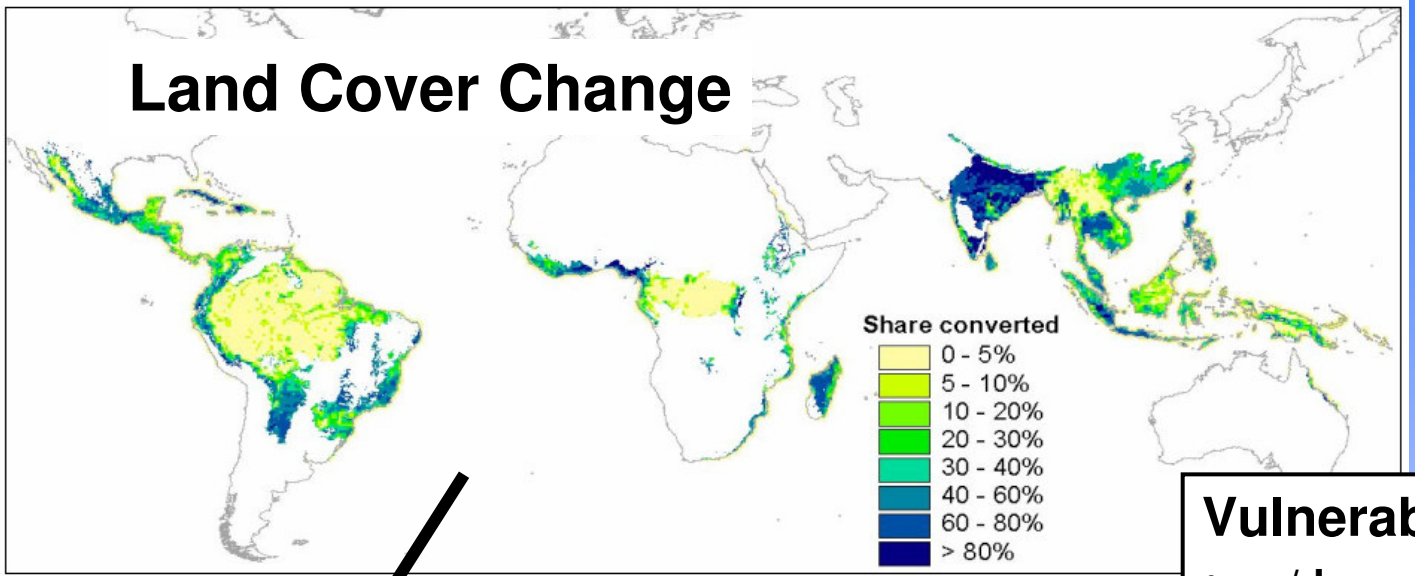
- ***Developing a prototype integrated modeling & data framework (IMDF) for global-scale water system experiments***
- ***Applying this framework to identify & rank in importance the major forces shaping the contemporary global water system***
- ***Assessing the impacts of a changing water system on society and ecosystems.***

**Consortium of Universities for the Advancement of Hydrologic Science, Inc.*

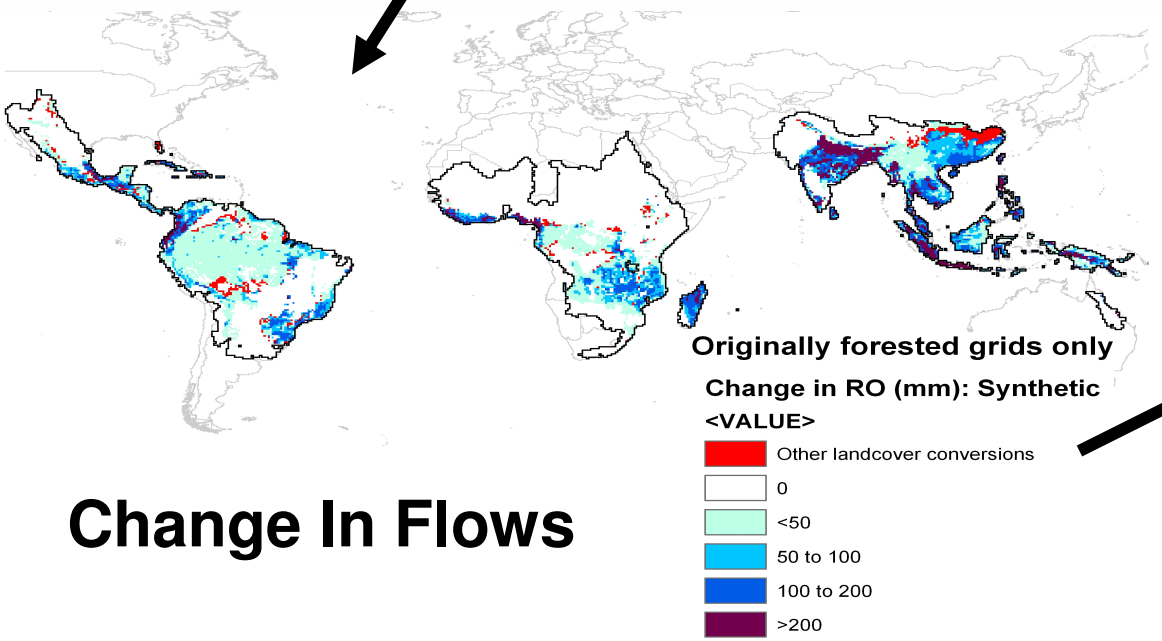
NCHS: GWS-WG


Integrated Modeling and Data Framework (IMDF)
Community-Based NCHS Global Water Modeling System
SCIENCE QUESTIONS
POLICY APPLICATIONS
Core Modules
HYDROLOGY and WATER SUPPLY
WATER MANAGEMENT (Engineering)
SOCIOECONOMIC FUNCTIONS (Demand, governance)
BIOLOGY/BGC (Multiple constiuents, biodiverity mapping)
Harmonized, Geospatial Data Repository, ATLAS
NCHS IT INITIATIVES (HIS/CHAI) (distributed data archives, modularization, optimization)

GWS-WG Application: Hydrology & Societal Vulnerability



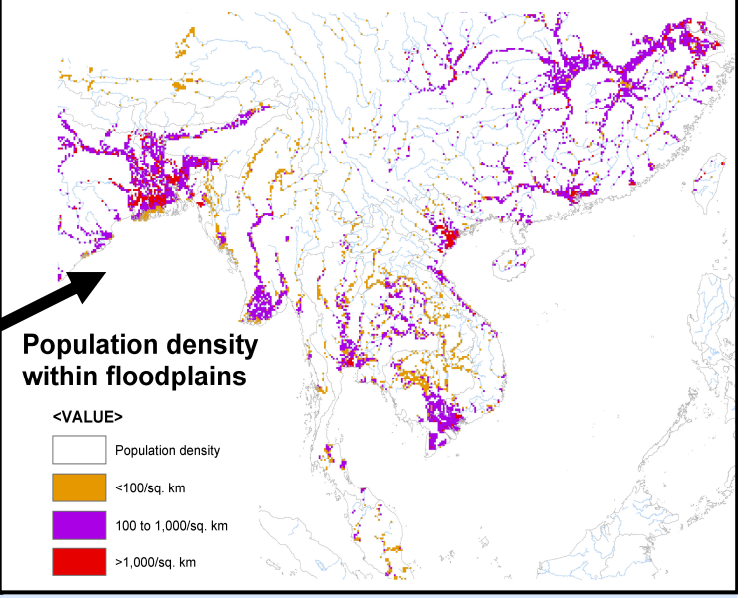
NEW CLASSES OF "teleconnections"



Change In Flows

Vulnerabilty Translated

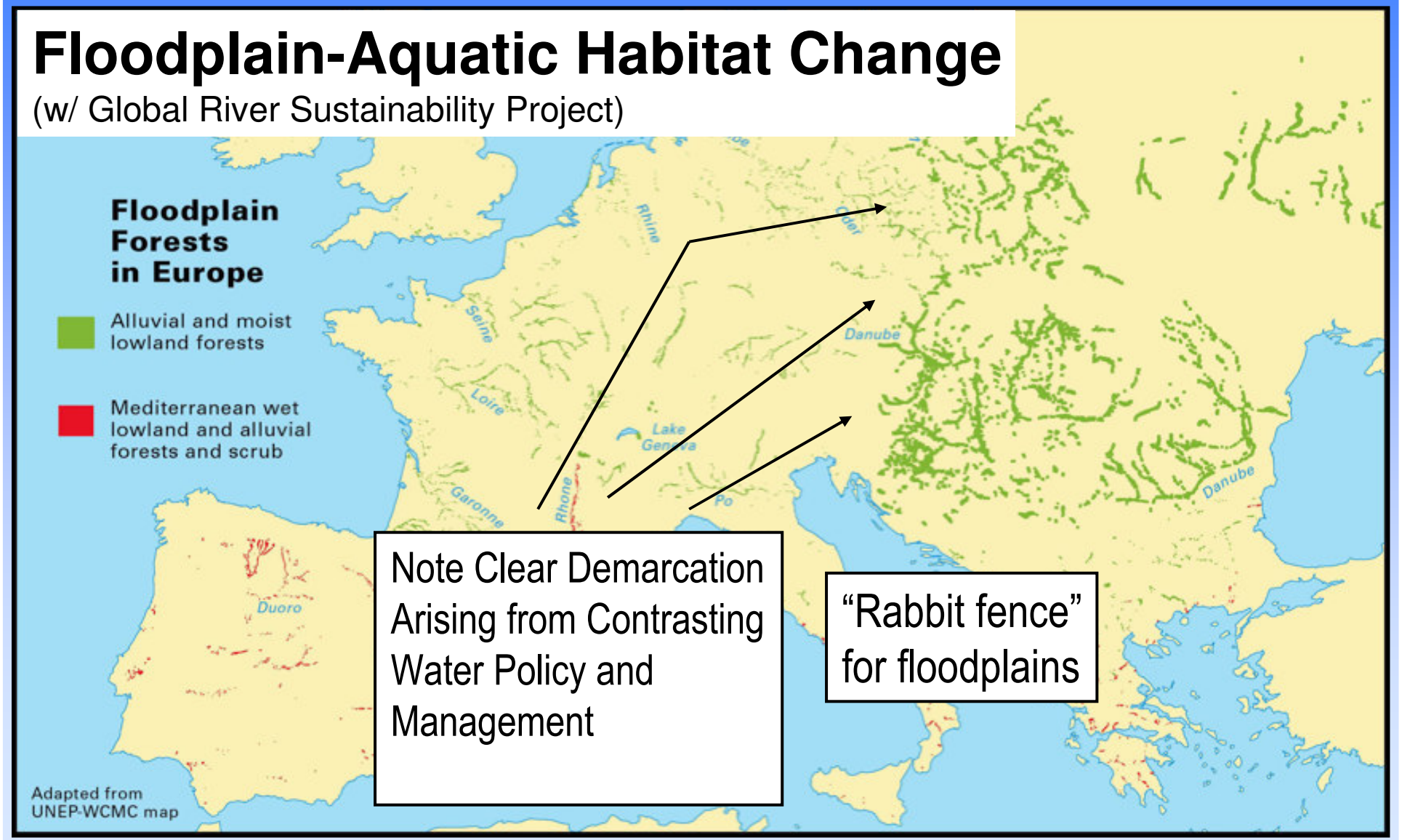
- up/downstream stakeholders
- humans & nature



GWS-WG Application: Environmental Flows & Biodiversity

Floodplain-Aquatic Habitat Change

(w/ Global River Sustainability Project)



Note Clear Demarcation Arising from Contrasting Water Policy and Management

"Rabbit fence" for floodplains

Working Group Membership: GWS-WG

Core planning group:

- *Charles Vörösmarty (lead) (University of NH) (macro-scale hydrology, water resources, biogeochemistry)*
- *Dennis Lettenmaier (physical hydrology & water management) (U. Washington)*
- *Robert Naiman (U. Washington) (aquatic ecology & environmental flows)*
- *Sybil Seitzinger (Rutgers U.) (biogeochemistry)*
- *Marc Levy (Columbia U.) (socioeconomic sciences)*

Expansion anticipated & welcome:

- *Mandate of NCHS community-based efforts*
- *Clear articulation of hydrologic cycle (stocks and dynamics) is "backbone" of effort*
- *NASA-NEWS research projects would provide a rich porfolio of science studies and expertise pool for developing integrated framework and component modules*
- *NCHS GWS-WG provides a concrete point of engagement for GWSP-NEWS collaboration, w/ tangible assets (post-docs, IT & WG support)*
- *Proposal pending….stay tuned*